46 Range Control Squadron

Journey from CMM® to CMMI®

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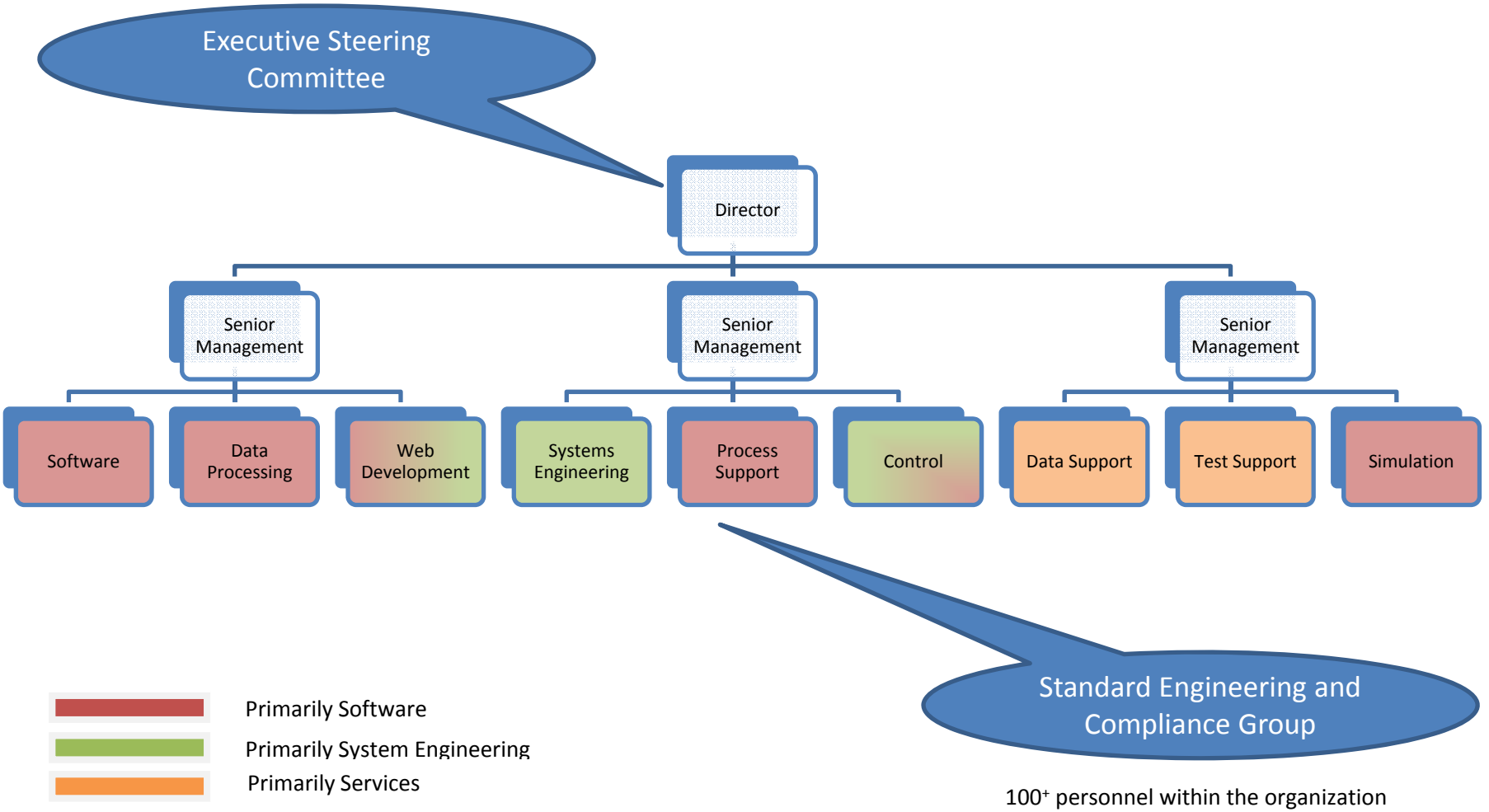
Overview

- Organizational Structure
- Journey Overview
- The Approach
- Challenges
- Lessons Learned

Organizational Structure



100+ personnel within the organization

Journey Overview


Software Technology Support Center

CERTIFICATE OF ACHIEVEMENT

This recognizes that the

96th Communications Group

Eglin AFB, Florida

has successfully achieved a

Software Engineering Institute, Capability Maturity Model rating of

LEVEL 5

on this day, 30 October 2003, by the following assessment team:

STSC Lead Assessor	Rushby Craig	96 OG Team Member	Jeremy Mings
STSC Team Member	Mike Ballard	96 OG Team Member	Lance Sharretty
96 OG Team Member	Kathy Reid	96 OG Team Member	Sean Tweedy
96 OG Team Member	Shea Turkey	46 SK Team Member	Tobias Cahoon
96 OG Team Member	Charlie Cleville	Alpha Data Corporation Team Member	Deborah Dudley
			Tim Deckert

Transitioning from CMMI v1.2 to v1.3

Effort expanded to Services (CM, QA, MA, Meetings, Peer Review, Management Reviews)

Effort expanded to Systems Engineering

OSP Streamlined using AFSO21 principles, Support Tools enhanced

Defect Prevention & TCM Processes established

PSO and TWGs established

SEPG and ESC established

1997

1999

2000

2002

2003

2004

2005

2006

2007

2008

2009

2010

2012…

CMM Level 2 achieved

Quick Look – Level 3 well established, high probability of Level 5

CMM Level 5 achieved

Benchmark Appraisal to establish CMMI transition plan

Benchmark SCAMPI A CMMI Level 3 Appraisal

SCAMPI A CMMI Maturity Level (ML) 5 Appraisal
Goal: ML3

Return on Investment Demonstrated

- **Higher Productivity (46% increase)**
- **Improved Quality (13% less corrective work)**
- **Better Estimation (56% improvement in achieving or exceeding organizational goals)**

The Approach

- Assess CMMI® Model Delta
- Expand Model Application
- Address the Culture Changes
- Update Processes/Tools
- Measure Performance Quantitatively

Assess CMMI® Model Delta

- Raised the bar:
  - Added a Measurement and Analysis Process Area (PA) at Maturity Level (ML) 2
  - Restructured 7 PAs into 11 PAs at ML 3
  - Renamed 4 PAs at MLs 4 and 5 to provide more focus on the quantitative nature of a high maturity organization
- Replaced *common features* with *generic goals* and *generic practices*
- Expanded software scope to include systems engineering, services as well as integrated process and product development

Expand Model Application

- Defined strategic business goals
  - Quality
  - Cost
  - Timeliness
  - Customer Satisfaction
- Integrated established best practices
  - Systems and Software Technology Conference (SSTC)
  - Software Engineering Process Group (SEPG) Conference
- Tailored/re-used proven processes
  - Change project to work or tasks
  - Change software to standard

Expand Model Application

- Communicated the Philosophy
  - Built a flexible process for adaptation
  - Sought common solutions – do not document each methodology being utilized (i.e. software process, systems engineering process)

- Established Process Improvement Goals
  - Identified the initial environment/scope
  - Defined the target environment/scope
  - Updated the interim environment to track the progress of migrating from the initial to the target environment

Address the Culture Changes

- Developed a Transition Plan
  - Systems Engineering
  - Services (Systems Administration)
- Involved affected personnel
  - Communicated often
  - Coordinated with the “E.F. Hutton” of the team to understand how to add value and mentor to them to serve as the Process Champion
  - Identified aspects of the model that would add value to the day-to-day tasks

Remember when we first started our journey – “we are unique” was said as much as “it depends”

Update Processes/Tools

- Distributed Process Ownership
  - Tailored processes to meet business needs for systems engineering and services
  - Empowered software and system engineers to work collaboratively to define, implement, manage and optimize process improvements
  - Encouraged identification of data-analysis based improvements
  - Mandated team members follow the process
- Instilled a Collaborative Environment
  - Updated tools to change terminology
  - Shared lessons learned from software development and communicate their applicability to systems engineering and services
  - Established User Group Meetings in a question/answer forum
  - Setup Quality Assurance support for each systems engineering and services task to maximize consistency

Update Processes/Tools

- Identified Role-Based Training Requirements
  - Trained core individuals defining the processes in the model versus the entire organization
  - Trained only the applicable processes when expanding the scope
  - Scheduled just in time training based upon planned process utilization

Measure Performance Quantitatively

- Created a Data Repository
  - Centralized project data access and storage
  - Reduced redundant data entry for daily tasks
  - Eliminated the “Big Honkin” binder
  - Automated quantitative analysis tasks

- Identified Measures
  - Created metrics based on strategic goal measures at the organization, management and project levels
  - Initially focused on breadth not depth – depth evolved based on the analysis results

Measure Performance Quantitatively

- Tracked Performance
  - Defined quantitative goals by which to measure performance
  - Identified frequency for reporting performance/status against goals
- Reported Performance
  - Reported metrics for systems engineering early in the transition phase
  - Highlighted differences in systems engineering execution of the processes to identify best practices and engage the systems engineers in the process effectiveness

Initial Perspective: Do not wait until data is needed to collect it - it will be too late

Current Perspective: Do not require data collection if an information need is not being addressed

Challenges

- 73% of the PAs were common between CMM® v1.1 and CMMI v1.2®
- 30% of the processes were perceived to be common between Software and Systems Engineering personnel
- 90% of the organization's processes were common between Software, Systems Engineering and Services once expansion was completed

Lessons Learned

- Most effort expended in communication with the Systems Engineering and Services personnel to move the 30% perception to the 90% reality

- Data is the best tool for communication as it shows the capability and stability of the processes being used within each discipline

Lessons Learned

- Not formally applying integrated process and product development (IPPD) practices limited the success of our journey – collaboration is critical to the transition

- Sharing past experiences and techniques between software , systems engineering and services personnel proved very effective

Lessons Learned

- Metric data for Services required a different context than Software or Systems Engineering – concept is the same but terminology is VERY different

- Change Agents, Process Champions and Management must create an environment for cultural change
  - Technology change is more readily accepted than process change

Lessons Learned

- Setting a planned, strategic expansion is key
  - Software set a strong foundation
  - Systems Engineering leveraged off that foundation without a significant impact
  - Services practice the activities, but without the formality

Summary

- Setting expectations to eliminate all resistance is unreasonable – effective process improvement program uses resistance to improve processes

- Addressing metrics in terms of breadth versus depth provides increased flexibility in data analysis when initial results vary from expectations

- Involving engineers early in the journey accelerates the process definition and cultural acceptance

Questions?

“Effective change demands continual, forward thinking with a desire to add value. If value is not added by the change, we must be willing to abandon it!”

by Kathy Reid